

TOBITA, A.

Appl. No. 10/733,339

Response to Office dated June 30, 2005

AMENDMENTS TO THE DRAWINGS:

Figure 3 has been designated with the legend "Prior Art". No new matter is added by this change.

Appendix: Replacement sheet

Annotated sheet showing changes

REMARKS

Reconsideration and allowance of the subject patent application are respectfully requested.

As requested, Figure 3 has been designated with the legend "Prior Art".

Claims 1-8 were rejected under 35 U.S.C. Section 103(a) as allegedly being "obvious" over prior art Figure 3 in view of Wheeler (U.S. Patent No. 4,017,782). While not acquiescing in this rejection or in the characterizations of the art relied upon in the rejection, claim 1 has been amended and claims 2, 4, 6 and 8 have been canceled without prejudice or disclaimer. The discussion below makes reference to the amended claims.

Claim 1 is directed to a DC-DC converter circuit in which a capacitor of a correction circuit is alternately charged and discharged via a resistor of the correction circuit in accordance with alternation of an on-state and an off-state of a PWM driving pulse signal, so that an output voltage of the correction circuit has a waveform close to an average of the PWM driving pulse signal. A period of time of the on-state of the PWM driving pulse signal is in inverse proportion to an input voltage of the DC-DC converter circuit, and the average of the PWM driving pulse signal is in proportion to the period of time of the on-state, so that the correction circuit outputs a voltage whose level is in inverse proportion to the input voltage. These features are described, for example, in connection with example embodiments at page 7, line 14 to page 8, line 4 and page 10, lines 3 to 18 of the subject patent application.

The office action acknowledges that prior art Figure 3 lacks disclosure of a correction circuit for outputting a voltage whose level is in inverse proportion to an input voltage of the DC-DC converter circuit. The office action purports to remedy this deficiency by reference to Wheeler. Wheeler is alleged to teach that "the use of such a correction circuit including a resistor (107) and a capacitor (114) which is connected in series wherein it provides voltage whose level is inversely proportional to an input voltage" is well-known. According to the office action, it would have been obvious to use such a correction circuit to provide a stable output voltage to the secondary side.

Applicants respectfully traverse these contentions.

First, Applicants respectfully submit that Wheeler would not have been suggestive of modifying prior art of Figure 3 as proposed in the office action. The resistor 107 and capacitor

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114 of Wheeler are part of an oscillator circuit (see col. 3, lines 46-47) and there is no description in Wheeler of these components functioning as a correcting circuit. Wheeler describes:

The oscillator is on so long as there is a voltage difference between the input terminals 72, 74 of the comparitor (sic). The voltage on the terminal is determined by the charge on the capacitor 114. During on-time of the oscillator, the terminal 76 is high, the diode is reverse-biased, and therefore, the rate of charge of the capacitor 114 is determined by the voltage across the resistors 105 and 107. During off-time, the terminal 76 is low and therefore the diode 110 conducts, bringing the junction of the resistors 105 and 107 effectively to ground potential, and, therefore the rate of discharge is determined by the resistor 107 alone. Col. 3, lines 47-59.

Based on the operation of resistor 107 and capacitor 114 in Wheeler, Applicant respectfully submits that one of ordinary skill would not have had any reason to modify the prior art Figure 3 configuration to include such components, especially in the manner set forth in claim 1. Wheeler uses the resistor and capacitor components in conjunction with an oscillator and this arrangement would not have suggested configuring these components in the prior art Figure 3 circuit in the manner set forth in claim 1.

Second, the office action states the motivation for making the combination would have been "to provide a stable output voltage to the secondary side." Applicant finds nothing in the cited prior art that provides such motivation and indeed the stated motivation appears to in fact be derived from Applicant's specification (see, e.g., page 4, lines 21-23). Applicant submits that it is improper to use advantages described in Applicant's own application as a motivation to combine when the prior art itself would have provided no such motivation (or any other motivation).

Third, Applicant respectfully submits that Wheeler provides no disclosure regarding the above-described features of claim 1, and further submits that these features are not well known in the art. The resistor 107 and capacitor 114 are not arranged in the manner described in the claims and do not provide an output voltage as claimed. A correction circuit as claimed that outputs a voltage whose level is in inverse proportion to the input voltage provides various advantages as described with reference to illustrative example embodiments in the subject application. By way of example, when a DC-DC converter circuit has an auxiliary output voltage circuit (see, e.g., circuit 7 in Fig. 1) for outputting a voltage in proportion to the input

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voltage, this output voltage can be corrected. By way of further example, when a DC-DC converter circuit has a current detecting resistor (see, e.g., resistor 16 in Fig. 2) connected to the main switching element, and an overcurrent measuring circuit (see, e.g., circuit 6 in Fig. 2), the voltage level converted from the peak current value of the primary side can be corrected.

Applicants respectfully submit that the features of claim 1 would not have been made obvious by prior art Figure 3 and Wheeler as proposed in the office action.

New claims 9 and 10 have been added. The subject matter of these new claims is fully supported by the original disclosure and no new matter is added.

Independent claim 9 calls for, among other things, a correction circuit for providing a correction for an error between an output voltage of a secondary side and a voltage appearing at an auxiliary winding of a transformer. Neither prior art Figure 3 nor Wheeler discloses or suggests a correction circuit for a DC-DC converter arranged in the manner specified in claim 9.

Independent claim 10 calls for, among other things, a correction circuit for providing a correction for an error between an output current of a secondary side and a current input to the primary side of a transformer. Neither prior art Figure 3 nor Wheeler discloses or suggests a correction circuit for a DC-DC converter arranged in the manner specified in claim 10.

The pending claims are believed to be allowable and favorable office action is respectfully requested.

Respectfully submitted,

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FIG. 3

PRIOR ART

